

Gray Leaf Spot of Corn

Department of Plant Pathology



Kansas State University
Agricultural Research Station
and Cooperative Extension Service

Gray leaf spot of corn, caused by the fungus *Cercospora zea-maydis*, is currently the most serious foliar corn disease in Kansas. Statewide, yield losses can average 20 to 30 percent on susceptible hybrids. It was first identified in the state in 1989 in the Republican River valley. From that initial find, the disease reached economic threshold levels by 1992. The disease has caused economic damage somewhere in the state every year since 1992. The disease is found



Figure 1. Yellow halos surrounding a pinpoint lesion are an early symptom of gray leaf spot.

in nearly all production areas of the state, spreading into new areas at a rate of about 15 to 30 miles per year. Currently, it is most severe in northeast Kansas and in the irrigated production areas of south central and southwest Kansas.

Symptoms

Early symptoms can be easily confused with other leaf diseases. A yellow halo surrounding a pinpoint lesion is visible when the leaf is held up to light (Figure 1). Within 2 weeks however, these lesions will begin to elongate. Mature lesions are pale brown or gray to tan, long (0.2 to 2.0 inches), narrow and rectangular, being characteristically restricted by the veins (Figure 2). On susceptible hybrids, the disease is usually first noticed attacking the lower leaves well before silking. In about 2 weeks, these lesions will generate a new crop of spores which infect the middle and upper leaves. As plants mature, susceptibility to gray leaf spot increases. With favorable weather, the lesions rapidly merge, killing entire leaves. Extensive blighting

may continue until all of the leaves on a plant are killed. Plants in this situation incur significant yield loss and are more susceptible to serious stalk rotting and lodging.

Spread

Corn is the only crop known to be attacked by the gray leaf spot fungus under field conditions. Although grain sorghum also has a disease known as gray leaf spot, it is caused by a different fungus named *Cercospora sorghi*. Neither species of fungus can cross over to the other crop under field conditions.

The fungus survives the winter in infested corn residue, especially when the residue is on or above the soil surface. There is ample evidence that under no-till



Figure 2. Pale brown or gray rectangular lesions are symptoms of mature gray leaf spot.

conditions, the fungus will survive through two winters in Kansas. Yield losses of 30 to 40 percent have occurred in corn planted into soybean stubble that followed no-till corn. Initial infection occurs in late June or early July in Kansas. Severity of the disease is not necessarily correlated with periods of high rainfall. Prolonged periods of leaf wetness (11 to 13 hours or longer) and high relative humidity

(>90 percent) such as might occur with heavy dews or fogs are favorable for disease development. Severe gray leaf spot damage often occurs in low spots or in fields bordered by trees or streams where air drainage is poor (thus prolonging the periods of leaf wetness). Temperatures of 70 to 85 degrees Fahrenheit are

considered ideal for disease development, but the disease can thrive in even the hottest of Kansas summers if moist conditions exist.

Management

A good management program will include a combination of crop rotation, tillage practices, hybrid selection, and fungicide applications. Rotating an infested field to a non-host crop (soybeans, wheat, sorghum, alfalfa) will reduce the level of inoculum in that field. The length of rotation will be determined by the intensity of tillage. As indicated previously, in northeast Kansas where no-till is frequently practiced, the disease can survive in corn residue through two winters and cause significant yield losses in corn planted into soybean stubble. Several studies have shown that the levels of gray leaf spot decline rapidly when residue is removed from the surface. Therefore, any tillage practice that puts the residue in contact with the soil will aid in reducing the level and time period that gray leaf spot is present.

There is good evidence that as a group, shorter maturity corn hybrids (95 to 105 days) will develop higher levels of gray leaf spot than will fuller season hybrids (105 to 120 days). However, there are short-season corn hybrids with good resistance to gray leaf spot, as well as full season hybrids with very little resistance. Many seed companies now include gray leaf spot ratings in their hybrid descriptions. While these ratings cannot be used to compare hybrids across companies due to differences in rating systems, they do provide a good guide for comparing hybrids within the same company.

Evaluations of hybrids for gray leaf spot reaction at Iowa State University have shown that there is little correlation between levels of gray leaf spot on the plant and final yield. That is, many hybrids with good resistance often have poor yields, while other hybrids with high levels of disease still produce consistently good yields.

Economically, the best management choice combines the use of a high yielding hybrid with an active scouting program. Scouting should begin 2 to 3 weeks before tasseling is expected to occur. If gray leaf spot lesions are not present in the field at this time, it is unlikely a fungicide spray will be needed. If lesions are found on the lower leaves, the field should be monitored once or twice a week to track the movement of lesions up the plant. If a highly susceptible hybrid is being grown and lesions can be found on the third leaf below the ear leaf, a fungicide spray will usually be beneficial. For moderately susceptible hybrids, lesions need to reach the second leaf below the ear leaf before a fungicide application is necessary. For the most highly resistant hybrids, a fungicide application is usually not beneficial unless the lesions can be found on the leaf immediately below the ear leaf just before tasseling. Currently, adequate control has only been achieved using propiconazole (Tilt®). The best results have occurred when a single application is made just before or at the beginning of silking.

New hybrids with higher levels of resistance are continually being introduced onto the market. Producers should study the results from hybrid performance tests, local county demonstration plots, and seed company plots in making their hybrid selection decisions.

Douglas J. Jardine
Extension Plant Pathologist

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.

Publications from Kansas State University are available on the World Wide Web at: <http://www.oznet.ksu.edu>

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Douglas J. Jardine, *Gray Leaf Spot of Corn*, Kansas State University, July 1998.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2341

June 1998

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age or disability. Kansas State University is an equal opportunity organization. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Marc A. Johnson, Director.

File code: Plant Pathology—1-2